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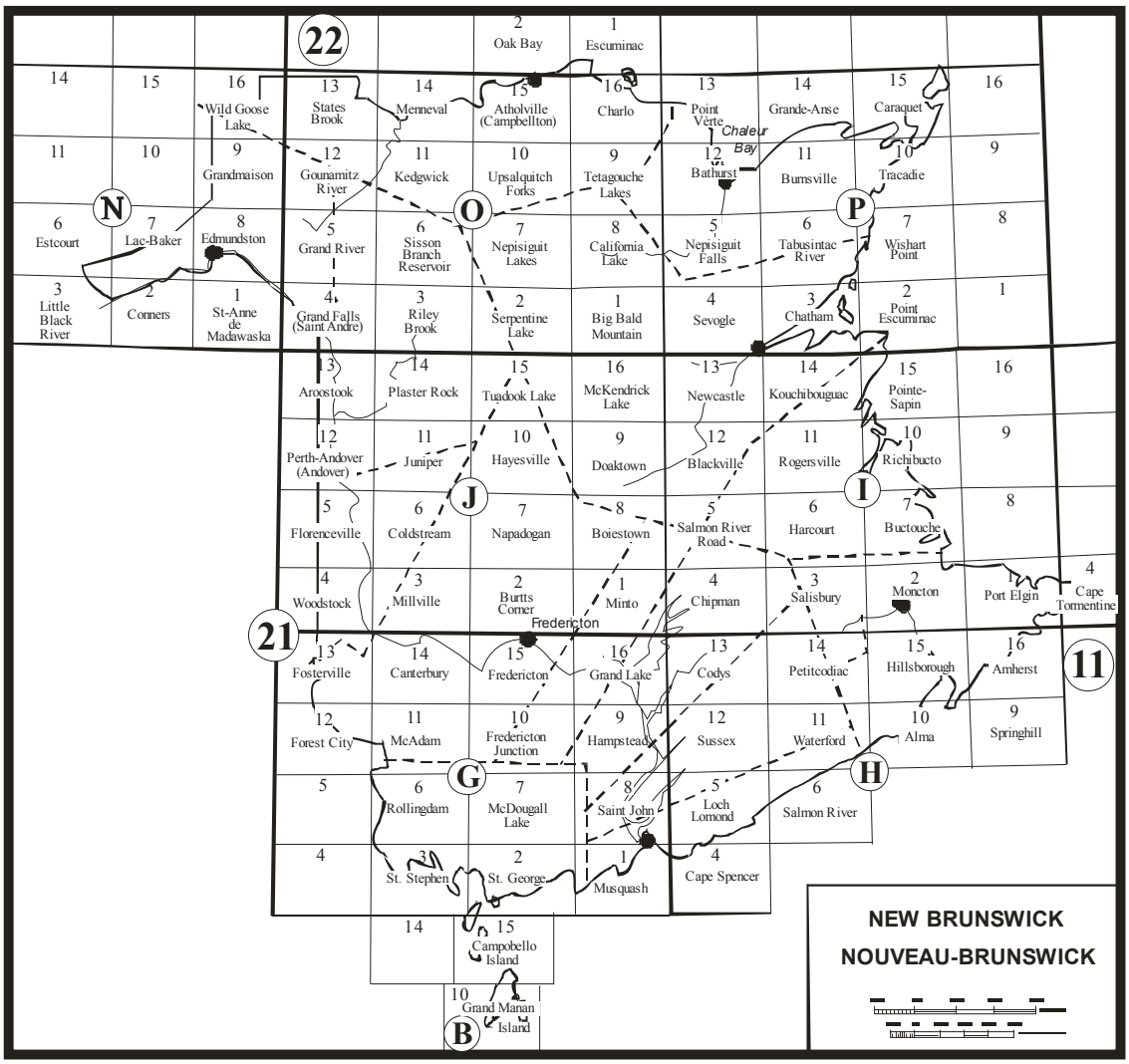

NTS Index Map

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USING FAYETTEVILLE SHALE LESSONS TO GUIDE A NEW BRUNSWICK EXPLORATION PROGRAM

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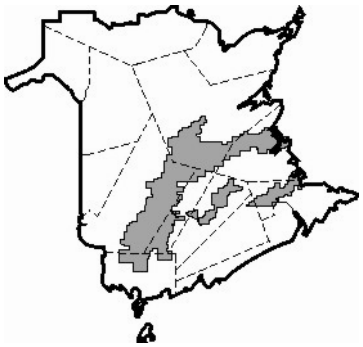
Southwestern Energy Resources Canada is a wholly owned subsidiary of Southwestern Energy Company (SWN). A three-year initial license was awarded in March 2010 to complete an exploration program in two distinct areas of the province covering approximately 1,000,000 hectares (2,500,000 acres). A total investment of $49 million Canadian is planned to determine the presence of commercial hydrocarbons in the licensed areas. The planned exploration activities include airborne gravity and magnetic, geochemical surveying, 2D seismic and exploratory well drilling during the three-year license period.

During the past 7 years, SWN has been the industry leader in exploring and developing the Fayetteville Shale in Arkansas. This Mississippian unconventional gas shale reservoir ranges in thickness from 15 to 230 meters (50 to 750 feet) and in depth from 450 to 2,000 meters (1,500 to 6,500 feet) and is located in the eastern portion of the Arkoma Basin.

To increase the value from this large resource play, SWN rapidly improved its drilling, completion and production techniques early in the life of this shale gas project. Integration of geology, geophysics, land, reservoir, drilling, completion, production, and economic analysis has been and will continue to be essential in driving that project's success.

This presentation describes the intensive data collection and analysis processes that will be used during the initial 3 years in New Brunswick. Many of the same techniques deployed to climb the well construction, completion, and production learning curves in the Fayetteville Shale, such as geological and geophysical analysis, completion, and stimulation design, and execution, as well as well construction design, will be modified as required and deployed in New Brunswick. These key design and operational techniques and strategies learned in the Fayetteville Shale will be discussed.

Abstract for oral presentation.



FREDERICK BROOK SHALE EXPLORATION AROUND SUSSEX, NEW BRUNSWICK

KHALID AMIN
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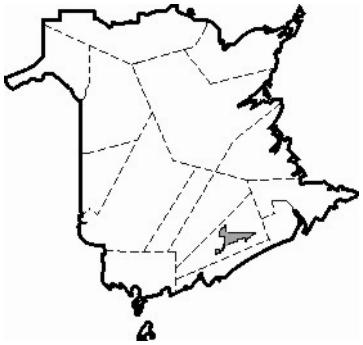
The Stoney Creek and McCully fields are the only producing reservoirs within the Moncton Subbasin. The source rock for the oil and natural gas is a thick succession of black organic rich shale called the Frederick Brook. The accepted geological model shows a series of "highs" and "lows" within the basin. Within the Moncton Subbasin, the Frederick Brook shale is up to 1,000 m thick and is regionally distributed over 60 km from McCully to Stoney Creek .To date, few wells have penetrated the entire Frederick Brook package; however, data from these wells suggest that a world-class shale gas play may exist.

Windsor Energy has accumulated 36,000 hectares of exploration land to the west and south of the McCully Field and our recently acquired seismic data indicate Frederick Brook shale is potentially present in those areas.

Abstract for oral presentation.



RESOURCE POTENTIAL OF THE MARITIMES BASIN, NEW BRUNSWICK, CANADA

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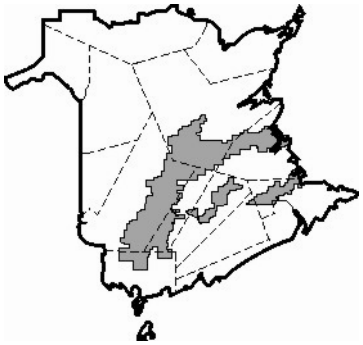
The Maritimes Basin is a Carboniferous basin in eastern Canada. Although much of the basin lies offshore in the Gulf of St. Lawrence, the largest onshore extent of the basin lies in New Brunswick and Nova Scotia. The Maritimes Basin formed during the Carboniferous as a series of pull-apart basins related to strike-slip movement along major fault systems similar to the modern-day San Andreas fault system of California. This event postdates the continental accretion resulting from the closing of the Early Paleozoic ocean basin and predates a final accretion event in the Permian. This final event resulted in compression and creation of folds and faults in the Maritimes Basins.

Existing oil and gas production from the Moncton Subbasin and numerous oil and gas shows across the region indicate the existence of a viable hydrocarbon system. Depth-to-basement interpretations made from magnetic data have identified a series of previously unknown subbasins covering more than two million acres in central New Brunswick. Additional magnetic, airborne gravity, geochemical, and seismic surveys will be conducted to confirm the presence and extent of these subbasins.

The known source rock in the area is the Carboniferous Frederic Brook shale member of the Albert Formation. This rich oil-prone source rock was deposited in a lacustrine setting and can be up to 1,000 feet thick and contain up to 20% total organic carbon. Although elevated maturity levels suggest natural gas will predominate at depth, liquids may be preserved on the shallower margins of the basin. Secondary targets are the Hiram Brook member sandstone beds. These sandstones may develop into conventional, structurally and/or stratigraphically trapped reservoirs. Evaporite beds of the Windsor Group form regional seals to the Hiram Brook sandstone, although uplift during the Permian caused the erosion or non-deposition of these beds in local areas.

Abstract for oral presentation.



CONTRIBUTION FROM THE INVERSION OF MAGNETIC AND GRAVIMETRIC DATA TO OIL EXPLORATION IN NEW BRUNSWICK

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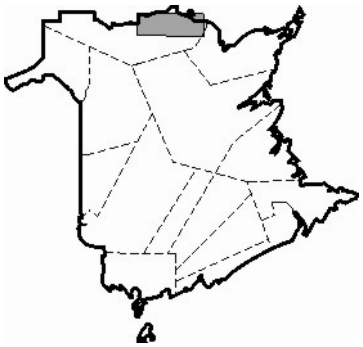
Pétrolia has four oil exploration licences in northern part of New Brunswick near Campbellton and Dalhousie. This region has a good and recent coverage of recent geoscientific data including geological maps and studies as well as magnetic and gravimetric data. Surface on Popelogan Inlier, located south of Pétrolia's property, has a high interest in gas exploration. First, open carbonatized and silicified fractures in the volcanics of Goulette Brook Formation (Balmoral Group) shows a potential as a reservoir rock. Second, the chert and black shale of the Popelogan Formation, above the volcanics constitute a good potential source rock and a good cap rock (Bertrand and Malo, 2005). The gravimetric data suggest that the volcanics extend north-east under the licenses of Pétrolia, where they constitute the main objective of exploration. To test this hypothesis, Pétrolia asked Mira Geoscience in 2009 to conduct a study of potential field inversion from geoscientific data available. The purpose of this study was to estimate the depth of the top of the Goulette Brook Formation where a density contrast is observed with the overlying rocks. The result of this work suggests that the Goulette Brook Formation culminates in a large dome under the Pointe Laroche anticline. Following this work, seismic reflection profiles were acquired to image the structure correctly. The result of the seismic survey has highlighted the extension of the volcanics of the Goulette Brook Formation under the rocks of the Gaspé Belt and to image the geometry of the anticline structures.

Abstract for oral presentation.



INSIGHTS ON THE STRUCTURE OF THE COCAGNE SUBBASIN, EASTERN NEW BRUNSWICK, AS INFERRED FROM NEW GROUND GRAVITY DATA

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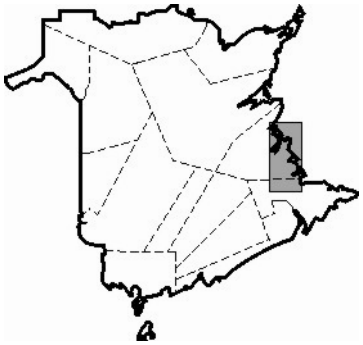
A regional gravity survey was undertaken in the fall of 2009 over a portion of the late Paleozoic Maritimes Basin in eastern New Brunswick that includes the eastern end of the Late Devonian to Early Carboniferous Cocagne Subbasin and adjacent areas of the New Brunswick Platform to the north. The survey area measured approximately 54 km along the Northumberland coast between Shediac and Richibucto and extended 11 to 23 km inland. A total of 708 new gravity stations with a nominal (though non-uniform) spacing of approximately 1 km were acquired using a modern gravimeter and the rapid-static GPS method for positioning.

The Cocagne Subbasin, thought to be a graben-like structure, is evident as a well-defined 10 – 15 mGal gravity low in the southern part of the survey area. The gravity low is bounded to the south by a relatively broad gravity high associated with uplifted Lower Carboniferous sedimentary rocks and crystalline basement rocks of the Indian Mountain Deformed Zone. In contrast, the northern boundary of the gravity low is well defined by abrupt changes in both gravity and vertical gravity gradient, suggesting that the basin is asymmetric in cross-section, thickening towards its northern margin against the New Brunswick Platform. It is proposed that this linear northeast trending anomaly marks the position of the Belleisle Fault and the northern boundary of the Cocagne Subbasin beneath Upper Carboniferous cover. The Belleisle Fault was previously extrapolated through this area along a pronounced magnetic anomaly that is now recognized to bisect the better resolved Cocagne Subbasin gravity low and to be co-linear with the trajectory of a subtle anomaly in the vertical gravity gradient. The inferred fault along that trajectory is herein renamed the Cormierville Fault, thus allowing the Belleisle Fault to retain its originally defined significance as the southern margin of the New Brunswick Platform in southern New Brunswick. Simple 2D forward modelling of two gravity profiles suggests that the Cocagne Subbasin within the survey area is 3 to 4 km deep north of the Cormierville Fault, and 2 to 3 km deep south of it, though these estimates were made without the benefit of either borehole control or seismic reflection data. Pre-existing gravity data from regions adjacent to our survey area suggest that the Cocagne Subbasin deepens towards the southwest.

Abstract for oral presentation.

Funding: Atlantic Innovation Fund (Pan-Atlantic Petroleum Systems Consortium), New Brunswick Geological Surveys Branch, Geodetic Survey Division of Natural Resources Canada (in-kind support).



DE-STRESS BLAST ZONE 20-21 AT BRUNSWICK MINE

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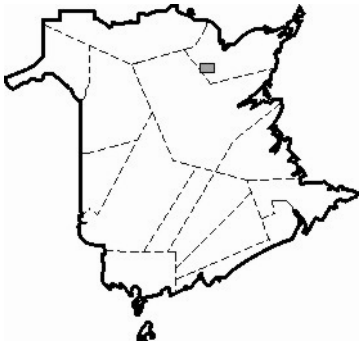
Brunswick Mine has been in operation for over 40 years and 127 million tons have been hoisted from underground. Many challenges surround the exploitation of a mine with such a long history; one of them is managing the high stresses caused by converging mining fronts. Brunswick Mine faced this challenge in zones 20-21. To add to the challenge of mining under high stress conditions without affecting production rates, zone 20-21 presented another challenge: 19 & 18 OP, two major infrastructures of the mine are located in the center of the stress caused by the convergence of those two mining fronts. A 128,000 ton de-stress blast was planned in order to close the stress window and be able to recuperate as many tons as possible in these two zones. A 3D inelastic numerical model was developed by a consultant to model the stress and optimize the mining sequence of the de-stress. The model is validated with actual data from seismic monitoring and observations underground. To date, the actual data confirms the model's predictions. We are presently halfway through our de-stress strategy, with the final blast scheduled for May. This talk will highlight the mining strategy used for de-stressing zones 20-21 and compare it to the actual results.

Abstract for oral presentation.



RENEWAL OF THE TARGETED GEOSCIENCE INITIATIVE: PUBLIC GEOSCIENCE IN SUPPORT OF DEEP EXPLORATION

ALAN GALLEY AND MIKE VILLENEUVE
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Budget 2010 renewed funding of $12 million over two years for the Targeted Geoscience Initiative 4 (TGI), with a focus on developing new ways of exploring deeper mineral deposits. The GSC and its provincial and territorial partners will increase the effectiveness of deep mineral exploration and discovery activities by providing industry with the enhanced geoscientific information and tools they need. The renewed TGI will create opportunities across Canada and will also help improve our global competitiveness while attracting international investment. Previous TGI programs were focused largely on supporting exploration for base metals in and around established mining communities. TGI-4 has a broader mandate than TGI-3, which will enhance geoscience knowledge in support of exploration for a variety of hidden mineral deposits in areas of highest known mineral potential, including both established and emerging camps in Canada.

Abstract for oral presentation.

Funding: Geological Survey of Canada, TGI-4.

STRATIGRAPHIC AND STRUCTURAL RELATIONSHIPS OF THE ELGIN AND COCAGNE AREAS, SOUTHEASTERN NEW BRUNSWICK: PRELIMINARY RESULTS FROM 2010 FIELD MAPPING

STEVEN J. HINDS
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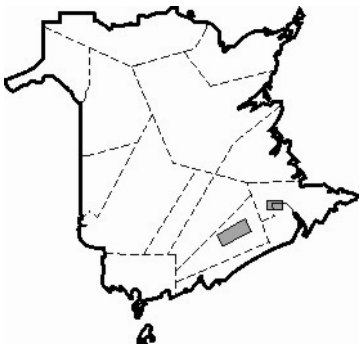
The Early Carboniferous rocks of southern New Brunswick were subjected to multiple phases of extension and inversion approximately 320 to 350 million years ago. These tectonic events resulted in multiple phases of overlapping fault structures that pose challenges in mapping the subsurface distribution of the Albert Formation and in determining the kinematics of each tectonic event. Recent field mapping in the Elgin and Cocagne areas has redefined stratigraphic correlations and identified new fault structures within the Tournaisian rocks. These results are presently being correlated with the subsurface using seismic data and boreholes.

Abstract for oral presentation.

Funding: New Brunswick Geological Surveys Branch ordinary budget.



PRELIMINARY CHEMOSTRATIGRAPHY OF THE MABOU GROUP IN THE PENOBSQUIS AREA, SUSSEX, NEW BRUNSWICK

NAZRUL ISLAM AND DAVID KEIGHLEY
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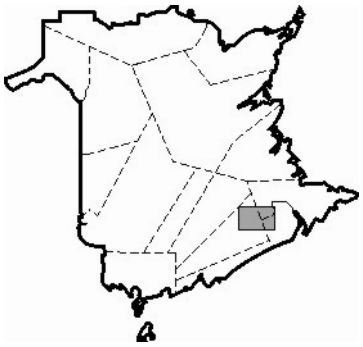
Lithostratigraphic subdivision for the Mabou Group in New Brunswick has previously met with little success due to limited outcrop, the absence of significant marker beds, and poor biostratigraphic control. The present study considers the post-Windsor Group section from drill core PCS-02-05 in the Penobsquis area to help subdivide the Group. Here, Mabou Group sedimentary rock consists of a variety of sandstone facies, gravel facies, and fine-grained facies. Most are brown, greyish brown or reddish brown, poor to moderately sorted, moderately compacted, ferruginous or calcareous, and mainly horizontally laminated or cross-stratified. Broadly, sandstone, siltstone, and mudstone at the base of the section gradually coarsen up into conglomerate, and considered the result of active alluvial fan progradation. However, horizontally laminated to cross-stratified bluish grey sandstone containing carbonaceous plant fragment and siltstone rip-up clasts occur between ~666 m – 686 m depth.

Bulk geochemical analysis (ICP-MS, XRD) of 59 samples from PCS-02-05 has indicated anomalously high concentrations of Sr between 615 m – 655 m whereas the Si/Na and Cs/Rb ratios increase and Ga/Rb ratio decreases above 655 m. Coinciding with these trends, petrographic analyses indicate localized concentration of anhydrite concretions at this depth interval. The preliminary interpretation is that an unconformity, identified by the rip-up clasts, is also manifested in the overlying succession by changing detrital mineralogy and diagenetic phases. Ongoing studies of adjacent drill cores will attempt to confirm these trends and the validity of an unconformity-based subdivision of the post-Windsor redbeds, first postulated by Gussow nearly 60 years ago.

Abstract for oral presentation.

Funding: Potash Corporation of Saskatchewan.



THE ELMTREE DEPOSIT: 2010 UPDATE

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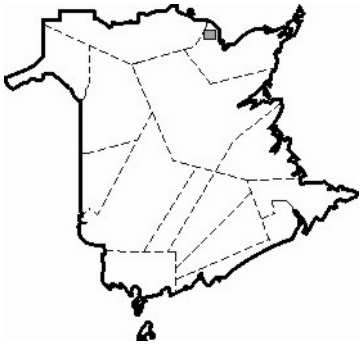
Following a positive preliminary economic assessment of the Elmtree deposit by Micon International (Micon) in early 2010, where Micon outlined a resource of almost 70,000 ounce of gold, management of Castle Resources Inc. (CRI) decided to move the project to the next stage and explore the possibility of successfully mining the West Gabbro Zone (WGZ) in the 3rd quarter of 2011.

To that end, CRI engaged Micon to perform a feasibility study of the WGZ and has drilled an additional 3,800 m as infill drilling to change the inferred resource classification outlined by Mercator Geological Services in 2007. Upon completion of the drilling program, CRI began the permitting process toward production. Stantec has been engaged to perform a comprehensive environmental review of the property and surrounding area. Currently, the feasibility study and environmental assessment are ongoing.

Abstract for oral presentation.



THE APPLICATION OF ADVANCED MINERAL EXPLORATION TECHNOLOGIES BY VOTORANTIM METALS CANADA INC. IN THE BATHURST MINING CAMP

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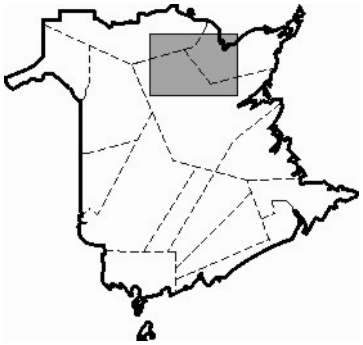
Votorantim Metals Canada Inc. may earn up to a 70% interest in the exploration properties of Xstrata Zinc in the Bathurst Mining Camp. Following a period of due diligence, Votorantim has conducted detailed helicopter-borne TEM-magnetic surveys, ground magnetic, gravity, soil geochemistry, and geological mapping surveys and over 7500 m of diamond drilling in several parts of the camp. In September 2010, the Government of New Brunswick announced the finalizing of an Agreement to provide funds matching Votorantim's expenditures of up to $2.5 million, for a total of up to $5.0 million, per year, over a period of three years to be applied to Advanced Exploration methods in the Bathurst Mining Camp. This presentation will review Votorantim's ongoing program and its plans for the application of new technologies in the search for new base metal resources.

Abstract for oral presentation.



CONSTRUCTING A 3D GEOLOGICAL MODEL OF THE MCCULLY GAS FIELD, SOUTHERN NEW BRUNSWICK

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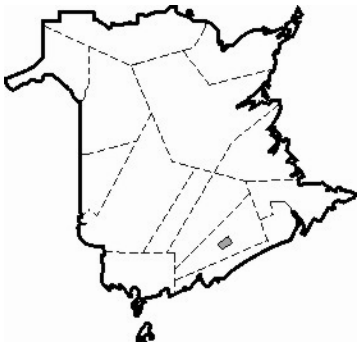
The McCully Gas Field in southern New Brunswick is a northeast-trending, anticlinal structure, discovered in September 2000. McCully gas came on-stream in April 2003. In June 2007, first gas was delivered to the northeast American market via the Maritimes and Northeastern Pipeline. Production is from the upper part of the Albert Formation (Horton Group) Hiram Brook Member sandstones at approximately 2.5 km depth. The field is structurally and stratigraphically complex and compartmentalized by faults. Production is from 30 wells over 7 reservoir packages.

In order to understand this geological complexity, a 3D model has been constructed of the McCully Field using multiple 3D seismic volumes, in combination with an extensive wellbore database. The objective of model construction is to understand the structure, fault compartmentalization, correlations, reservoir characteristics, and gas in place volumes in greater detail. By developing a more consistent and integrated analysis in 3D space, the model can be utilized to plan complex wellbores with greater accuracy and to optimize gas extraction into the future.

Abstract for oral presentation.



THE NEW BRUNSWICK EXPLORATION ASSISTANCE PROGRAM

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The New Brunswick Exploration Assistance Program is offered by the Lands, Minerals and Petroleum Division to help fund various exploration projects by junior mining companies and prospectors in the province. Currently, the program is renewed on a yearly basis and encompasses the New Brunswick Prospectors Assistance Program (NBPAP), the New Brunswick Junior Mining Assistance Program (NBJMAP), the New Brunswick Deposit Evaluation Program (NBDEP), promotions and training. The total amount of money awarded this year will be $1,115,000.

The NBPAP is a financial assistance program for prospectors searching for metallic or industrial minerals (except aggregates) in the province. This year, forty six prospectors received a total of $250,000, ranging from $1,000–$13,000 each. Fifty thousand dollars was budgeted for training and promotions which includes introductory courses around the province and for promotional activities such as prospector support for travel to the Prospectors Development Association Convention in Toronto and the Cordilleran Roundup in Vancouver.

The NBJMAP is a financial assistance program for private-sector junior mining companies. It provides up to 50% of eligible costs, within defined limits, for mineral exploration projects. This year, there were nineteen applications and fourteen received a total of $480,000 in grants ranging from $20,000–$45,000 each.

The NBDEP is a financial assistance program available to private or publicly traded mineral exploration companies and is intended to support exploration activities aimed at evaluating and upgrading a historical reported resource estimate on a minerals deposit to NI-43-101 standards. Funding for this module was $200,000 and was awarded to two companies each receiving $100,000. A total of six companies applied for funding.

In addition to these assistance programs, $100,000 was budgeted to the upgrade drillcore facilities in Bathurst and Sussex.

The NBPAP and the NBJMAP programs have been highly successful in helping locate and enhance viable exploration targets throughout the province, in promoting these properties locally and nationally, and in training new and more experienced prospectors. Consequently, these assistance programs are highly regarded by the New Brunswick Prospectors and Developers Association and the mining industry in general.

Abstract for poster presentation.

Funding: New Brunswick Geological Surveys Branch ordinary budget.

INDICATOR MINERALS OF BASE-METAL MINERALIZATION: EXAMPLES FROM THE BATHURST, THOMPSON, AND SUDBURY MINING CAMPS

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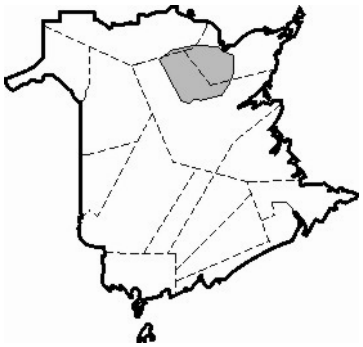
Similar to kimberlites, base-metal deposits have characteristic suites of indicator minerals that can be recovered from till and stream sediments. However, very little research has been conducted to document the abundance and chemistry of these minerals in the deposits and surrounding surficial media. To address this knowledge gap, the Geological Survey of Canada (GSC), through its Targeted Geoscience Initiative 3, in collaboration with the Canadian Mining Industry Research Organization (CAMIRO), the New Brunswick Department of Natural Resources, and the Manitoba Geological Survey, collected and analyzed suites of bedrock and till samples around the: 1) Halfmile Lake Zn-Pb-Cu deposit, Bathurst; 2) magmatic Ni-Cu deposits, Thompson Nickel Belt; and, 3) Broken Hammer Cu-(Ni)-PGE occurrence, Sudbury North Range. The objective of these case studies was not to define the dispersal trains from the deposits. Instead, sample sites were selected to characterize the geochemical and mineralogical signature of base-metal mineralization at the deposit- and camp-scale at varying distances down-ice and to define background. Indicator mineral results from each of the 3 test sites will be described and compared and their applications to base-metal exploration discussed.

Abstract for oral presentation.

Funding: Geological Survey of Canada, TGI-3, New Brunswick Geological Surveys Branch, Natural Science and Engineering Research Council of Canada Discovery Grant, CAMIRO.



CAPTAIN AND CAPTAIN NORTH EXTENSION: UPSIDE-DOWN VMS DEPOSITS IN THE EASTERN PART OF THE BATHURST MINING CAMP, NEW BRUNSWICK

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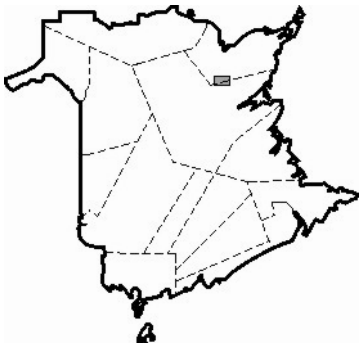
The Captain and Captain North Extension deposits are both hosted by the Middle Ordovician Nepisiguit Falls Formation (ca. 468 Ma) of the Tetagouche Group. At Captain, this formation comprises an upper unit of coarse-grained crystal tuff (proximal facies), a middle volcaniclastic unit (distal facies) composed of ash tuff interbedded with fine-grained crystal tuff and mudstone, and a lower unit of coarse-grained crystal tuff. The deposit, a Cu-Co stringer system, sits within Fe-chlorite-altered rocks of the upper coarse-grained unit, at or near the contact with the fine-grained unit. It has a lenticular form suggesting a stratigraphic control on the geometry of the known zone, but to the south, these chloritic-mineralized rocks migrate obliquely across the axis of a southerly plunging F_2 anticline indicating that the "alteration pipe" is cross-cutting on a large scale. The known mineralized zone is in the overturned limb of this anticline and one deep intersection has associated carbonate alteration, indicating proximity to the paleosurface, (i.e., the "Brunswick Horizon"). Therefore, there is a good possibility for exhalative massive sulfides in this area. Notably, the contact with the Flat Landing Brook Formation is just south of Captain, where it is folded by the F_2 anticline. To the west, the Nepisiguit Falls-Flat Landing Brook contact is overthrust by sedimentary rocks of the Miramichi Group and there is an untested magnetic anomaly in this area.

At Captain North Extension, the deposit is largely within crystal tuff of the Nepisiguit Falls Formation, as indicated by ghost textures within the host rocks. Altered ash tuff and aphyric rhyolite, both assigned to the Flat Landing Brook Formation, constitute both the structural hanging wall and footwall to the deposit (i.e., the deposit is upside down and sits at the "Brunswick Horizon"). More specifically, the deposit occurs in the downward-facing limb of a recumbent F_1 anticline that is refolded by a westward-facing, northerly trending F_2 synform, which plunges shallowly to the north. The mineralization is stratabound replacement type, not strataform exhalative type, which explains the absence of oxide iron formation and the presence of minor amounts of mineralization in the stratigraphically overlying ash tuff (possibly Nepisiguit Falls Formation). The deposit is cut off to the north by an east-west trending, steeply dipping, dextral fault (previously referred to as the "North Fault").

Abstract for oral presentation.



PROCESSING BATHURST MINING CAMP FULL TENSOR GRAVITY SURVEY

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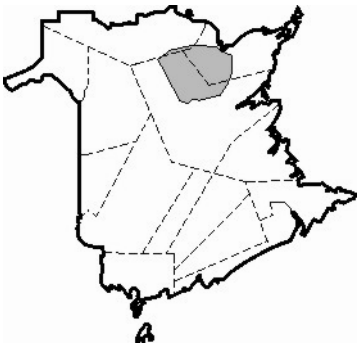
In 2004, Bell Geospace acquired airborne full tensor gravity gradiometry (FTG) data over the Bathurst Mining Camp (BMC). The survey was funded by Noranda Inc. (now Xstrata Canada Corporation) and Slam Exploration Ltd. under the New Brunswick Department of Natural Resources Advanced Exploration Program. Data was acquired from February–May in 2004 and weather conditions were quite challenging for data acquisition. The data were originally processed and delivered shortly after completing acquisition in June 2004. Upon comparing the original data with ground survey data and geologic maps, parts of the FTG data appeared to be noisy. Bell Geospace has since made multiple advances in data processing. As the acquired data was somewhat noisy, the BMC FTG data was used to test new data processing methods. Additionally, developed methods that incorporate all components of the gravity tensor, such as lineament analysis, shall be presented.

Abstract for oral presentation.



DEFORMATION OF THE NEOPROTEROZOIC TO CAMBRIAN ROCKS BETWEEN THE CALEDONIA HIGHLANDS AND EAST SAINT JOHN, SOUTHERN NEW BRUNSWICK

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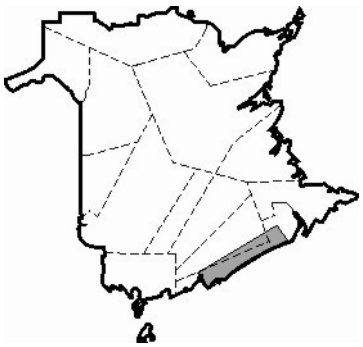
In the western part of the Caledonia Highlands two Neoproterozoic units, the 625 Ma – 620 Ma Broad River Group, and the 560 Ma – 550 Ma Coldbrook Group, are tectonically juxtaposed along the St. Martins – Stuart Mountain (SMSM) high-strain zone. The original contact between these two units was probably an unconformity. Deformation of the Broad River Group began shortly after the intrusion of the ca. 620 Ma Pointe Wolfe River granitoid suite, before the deposition of the Coldbrook Group. The multiphase history of the SMSM high strain zone continued after deposition of the Coldbrook Group and intrusion of the ca. 550 Ma Bonnell Brook and related plutons, and the two units are intricately interlayered along this zone. In the Little Salmon River area, rocks of the Broad River and Coldbrook groups are interlayered with Cambrian Saint John Group rocks in a complex of south-verging thrusts and south-facing recumbent folds, and these structures appear to root to the north in the SMSM high-strain zone, indicating its history of deformation continued until later than Cambrian time. This is consistent with muscovite cooling ages ($^{40}Ar/^{39}Ar$) from within the SMSM high-strain zone of ca. 390 Ma (Middle Devonian). This fundamental structure of the Caledonia Highlands therefore, has a long and complex history.

West of St. Martins, tracing the continuation of the SMSM high-strain zone is complicated by the presence of Late Carboniferous (possibly Late Pennsylvanian) deformation features that emplaced crystalline basement rocks on top of Carboniferous formations. Some of these tectonic slivers are clearly of Caledonia terrane affinity, but others are more enigmatic. Despite this complication, some relationships predating Late Carboniferous tectonism can be clarified. East of, and within, the city of Saint John, the Saint John Group sits unconformably on Coldbrook Group. The Saint John Group itself is deformed, with large-scale open folds overturned toward the north. Preliminary studies also indicate open folds that face south in the stratigraphically lowest part of the Saint John Group. An initial attempt to produce a down-plunge profile integrating these observations highlights the outstanding problems in the structural history of this area and indicates areas were future investigations are necessary – namely the Big Salmon River and east Saint John areas.

Abstract for oral presentation.

Funding: New Brunswick Geological Surveys Branch and Natural Science and Engineering Research Council of Canada Discovery Grant.



QUATERNARY MAPPING AND TILL GEOCHEMICAL PROJECTS IN NORTHERN NEW BRUNSWICK

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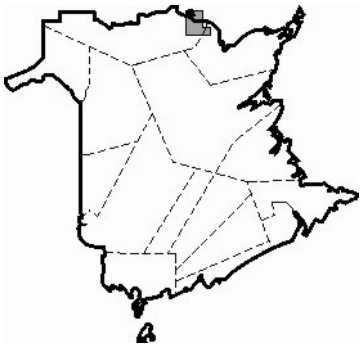
Quaternary mapping and till geochemical exploration projects in northern New Brunswick continued in the eastern half of the Charlo map area (NTS 21 O/16E) in 2010, including the part of the Charlo area within the Jacquet River Gorge Protected Area (JRGPA). A total of 134 basal till samples were collected in 21 O/16E, and an additional 10 sites were sampled in the southwest part of the Pointe-Verte area (21 P/13) within the JRGPA to fill in a gap in a previous survey. The samples will be analyzed at ACME laboratories for an ICP-MS multi-element suite.

The Charlo area is within the Chaleur Uplands and Chaleur Coastal Plain physiographic subdivisions and several large scale glacial features are present; i.e., eskers; drumlinoid landforms, and a series of nested and pitted deltas. Basal till is thin and locally derived in most of the area, except along the Bay of Chaleur where a thicker, “older” possibly Early Wisconsinan till, underlying glaciofluvuial and glaciomarine sediments, contains clasts derived from a wider source area. Ice flow direction in the area is mainly eastward followed by northeastward toward the Bay of Chaleur. Approximately 75 pebbles were collected at each site to determine glacial transport distances. This study may assist in ongoing mineral exploration projects around the Nash Creek massive sulphide deposit and the Benjamin River rare earth element prospect and possibly point to new areas of potential.

This study is part of an ongoing till geochemical program intended to cover all of the 21N, 21O, and 21P areas. Most of the sample sites are located on a standard 2 km grid except for the northwest part of the province (underlain by sedimentary rocks of the Devonian Temiscouata Formation; approximate 4 km spacing) and the eastern part of 21P (underlain by Carboniferous sedimentary rocks; 10 km spacing). Processing of samples collected over the past 4 years will allow a large amount of data to be released during the next calendar year, adding to the existing till geochemical database and providing information needed to develop a glacial dispersal model for all of northern New Brunswick. All published till geochemical data are now available digitally at minimal cost on one CD-ROM. Future work will involve updating the CD with the sampling from the last few years and production of some regional scale till geochemical maps to assist mineral exploration, land-use planning, etc. Results from all of the recent work will be assessed to identify areas requiring more detailed work (2 km spaced or detailed mineral deposit scale studies).

Abstract for poster presentation.

Funding: New Brunswick Geological Surveys Branch ordinary budget.



DEPOSITIONAL ENVIRONMENTS OF THE ALBERT FORMATION BASED ON PETROGRAPHIC AND PETROPHYSICAL WELL ANALYSES FROM THE MCCULLY FIELD, SOUTHERN NEW BRUNSWICK

CRAIG PARKS
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The hydrocarbon-bearing Albert Formation (Horton Group) occurs throughout much of the Late Devonian to Pennsylvanian Moncton Subbasin of the Maritimes Basin in New Brunswick. The Early Mississippian Albert Formation is a mainly grey fluvial and lacustrine sequence interpreted as having formed in a range of deep to shallow lacustrine to marginal alluvial environments. Regionally, the formation comprises three members that, in descending order, are 1) the Hiram Brook, a sandstone lithofacies that acts as an oil and natural gas reservoir, 2) the Frederick Brook, an organic shale lithofacies that is the source rock for the oil and natural gas, and 3) the Dawson Settlement, a basal sandstone lithofacies. Determining the relationships among these Albert lithofacies is key to understanding the basin architecture of hydrocarbon-bearing reservoirs within the Moncton Subbasin, one of which is the currently productive McCully Field near Sussex.

Petrographic and petrophysical analyses of six wells in the McCully area were used to identify tops of the different Albert lithofacies and to correlate them across the McCully Field. The analyses also helped to define four types of sandstone depositional cycles in the Hiram Brook and Dawson Settlement members. Recognizing these cycles provides a basis for determining the various depositional environments of the Albert Formation and, as a result, advancing our knowledge of basin architecture in the McCully Field.

The Hiram Brook Member mainly comprises interbedded clastic sequences of sandstone, siltstone, and shale that are divided into shale- and sandstone-dominated lithofacies. The latter lithofacies is the reservoir rock that hosts the tight gas produced from the McCully Field. The Frederick Brook Member consists primarily of shale with minor interbedded sequences of siltstone and sandstone. It is divided into an upper clay-rich shale lithofacies and a lower dolomite-rich shale lithofacies. Several wells in the McCully area produce, or have tested for, gas from the upper lithofacies, and one well produces gas from the lower lithofacies. Along the southern margin of the Moncton Subbasin, exposures of the Dawson Settlement Member are represented by a coarse to fine clastic and carbonate lithofacies. Well evidence suggests that the Dawson Settlement lithofacies is not represented at depth within the McCully Field but instead passes basinward into the dolomite-rich lithofacies of the Frederick Brook Member.

Abstract for poster presentation.

Funding: New Brunswick Geological Surveys Branch ordinary budget.

THE LANDRY BROOK, DICKIE BROOK AND CHARLO PLUTONS, NORTHERN NEW BRUNSWICK: FIELD RELATIONSHIPS, GEOCHRONOLOGY, PETROLOGY AND TECTONIC IMPLICATIONS

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The Landry Brook, Dickie Brook, and Charlo plutons cover a combined area of approximately 80 km^2 in the northeastern part of the Silurian-Devonian Tobique-Chaleur tectonostratigraphic belt (Chaleur Bay Synclinorium) in northern New Brunswick. The host rocks are the Llandoverian-Ludlovian Upsalquitch, Bryant Point, New Mills, and Benjamin formations and possibly La Vieille Formation. Based on a compilation of previous work combined with new field mapping, petrography, geochronology, and chemical data, four different units have been recognized in the Landry Brook plutonic suite: an early gabbro unit, a granodiorite unit, a quartz monzonite unit and a late intrusive unit composed mainly of quartz monzonite and quartz diorite. The granodiorite occurs only in the southwestern part of the pluton and is possibly genetically linked to the porphyry copper mineralization in that area. A quartz monzonite sample from Landry Brook pluton yielded a U-Pb (zircon) crystallization age of 419.5 ± 0.5 Ma.

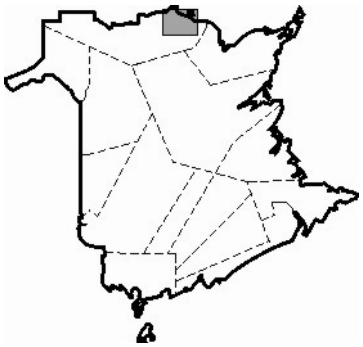
In the case of the Dickie Brook suite, three mafic units have been recognized: a gabbro and a diorite to quartz diorite unit which are contemporaneous (comingled), and late basaltic dykes cutting both earlier mafic units. The REE-bearing apatite-rich feldspar porphyry occurring in the eastern part of the pluton is most likely related to the late mafic stage. A high concentration of magnetite veins in the country rocks (Bryant Point Formation) also occurs approximately 1 km south of the deposit. An intermediate monzonitic unit has been recognized in the area cutting the earlier gabbro. A meso- to melanocratic pink quartz monzonite and late aphanitic to porphyritic dykes form the major felsic units in the Dickie Brook suite. A medium-grained, granophyric monzogranite sample yielded a U-Pb (zircon) crystallization age of 418 ± 1 Ma, the same age as the Landry Brook quartz monzonite.

In the case of the so-called Charlo stocks, they are a group of dykes and plutons west of the Dickie Brook and Landry Brook plutons and consist mainly of high-level, fine- to medium-grained, granophyric quartz monzonite with miarolitic cavities and plagioclase-amphibole dacite porphyries. Fine-to medium-grained basaltic/gabbro dykes also occurs in the vicinity of the Charlo suite.

Previous geochemical data show these rocks to be metaluminous and formed in a post-collisional environment. They are part of widespread magmatism in central and northern New Brunswick and adjacent Maine, for which the petrogenesis and tectonic setting have been traditionally associated with the Acadian Orogeny. However, the new dating and more comprehensive field work throughout the belt suggest in fact that Salinic affinity is more probable.

Abstract for poster presentation.

Funding: New Brunswick Geological Surveys Branch and Natural Science and Engineering Research Council of Canada Discovery Grant.



GEOLOGIC MAP FOR LAND-USE PLANNING FOR NEW BRUNSWICK: FREDERICTON MAP AREA (NTS 21 G/15)

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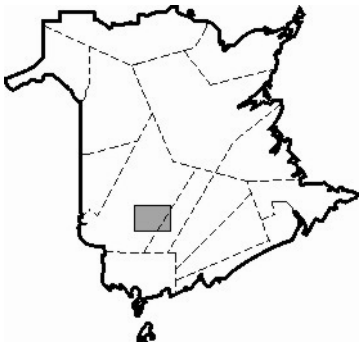
It is in the Province of New Brunswick's best interest that valuable mineral and other natural resources not be removed from development because of uninformed land-use planning decisions. The geoscience information that the Geological Surveys Branch gathers, though primarily used by the exploration industry to search for and develop mineral and hydrocarbon-related resources, is critical for making informed land-use planning decisions in New Brunswick. It is imperative that this geoscience information be made readily available to other government agencies, land-use planners, and related stakeholders in a standard format to ensure that knowledgeable decisions are made with regard to ever-increasing, and commonly conflicting, land-use needs.

This project utilized geoscience data from the Fredericton map area (NTS 21 G/15, 1:50 000 scale) to produce a geologic map for land-use planning with thematic layers including; bedrock geology, surficial geology (granular aggregate, peat), administrative areas, wetlands, and protected well fields, among others. Each thematic layer is referenced to its source and associated database. Ultimately, New Brunswick's geologic maps for land-use planning aim to highlight the mineral and other natural resource potential of given areas within the Province, provide avenues to locate more detailed information, and allow for more inclusive, multi-interest land-use planning decisions.

Abstract for poster presentation.

Funding: New Brunswick Geological Surveys Branch ordinary budget.



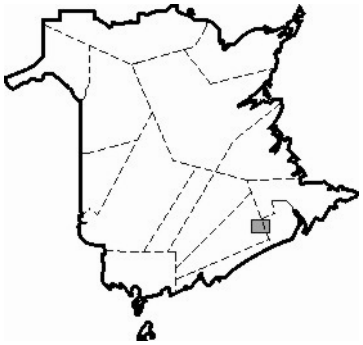
SHALE GAS EXPLORATION IN THE FREDERICK BROOK SHALE: APACHE CANADA'S PROGRAM IN THE MONCTON SUBBASIN, ELGIN AREA, NEW BRUNSWICK

CRAIG RICE
Petrophysicist
Apache Canada Ltd., Calgary (craig.rice@apachecorp.com)

The Frederick Brook Formation has the potential to be a world-class, unconventional reservoir, orders of magnitude richer (on an acreage basis) than shale gas plays elsewhere on the continent. Apache Canada has entered into a farm-in agreement with Corridor Resources to conduct exploratory drilling and testing in the Elgin area. Two horizontal wells with multistage fracture stimulations will be drilled into the Upper Frederick Brook and tested by year end.

An overview of this year's program will be given. We will discuss lease layout, well design, fracture stimulation, testing, our water management plan, and regulatory best practices utilized in these Phase 1 operations. A look towards our Phase 2 appraisal plans and Phase 3 development ideas will also be shown.

Abstract for oral presentation.



GEOCODING OF PEATLAND INVENTORY MAPS, NEW BRUNSWICK

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In 1987, the Department of Natural Resources published the results of an extensive survey of provincial peatlands. Data compiled included a series of 289 isopach 1:10 000 scale maps showing peat thickness and peat core locations. The availability of a detailed geoscientific resource database explains in part the success of the peat industry in New Brunswick, the Province being the leading exporter of peat in Canada and a major player on the international scene.

Originally available as paper prints, the peatland inventory maps were scanned in 2003 as PDF files to facilitate their distribution through electronic media. Peat core data in ASCII file format were imported into an Oracle database to facilitate searching and classifying the boreholes by criteria such as peat depth, botanical composition, or degree of humification. The current project consists of geocoding the map information to allow its use in GIS systems and to establish a geographical link with a database that contains stratigraphic information on more than 20,000 individual peat core sites.

Abstract for poster presentation.

Funding: New Brunswick Geological Surveys Branch ordinary budget.

GEOPHYSICAL MODELLING OF THE 3D ARCHITECTURE OF THE BATHURST MINING CAMP, NEW BRUNSWICK

NEIL ROGERS[1], HERNAN UGALDE[2], BILL MORRIS[2], CEES VAN STAAL[3], AND MIKE THOMAS[1]
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The 2005-2010 third phase of the Targeted Geoscience Initiative (TGI-3) was instigated to improve the geoscience knowledgebase of Canada's major base-metal mining districts and reduce the inherent risk in exploration and development associated with the extension of known reserves and the search for new, deeply buried deposits.

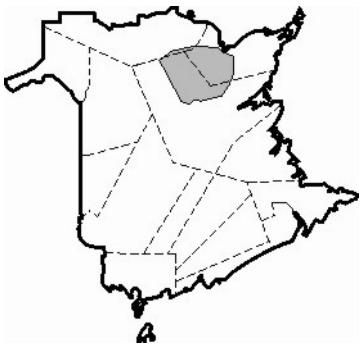
For the Bathurst Mining Camp (BMC), basic geological studies, combined with the application of new techniques and technologies, are essential for future mineral exploration. Although the outcrop distribution for the bedrock geology of the BMC is reasonably well established, the spatial distribution of units at depth is relatively poorly constrained. In part, this is due to the prevalence of steeply dipping fabrics over much of the BMC that do not necessarily reflect the overall enveloping surface of the mineralised horizons. Approximately 70% of BMC's massive sulphide deposits were discovered in the 1950's using a combination of geological and geophysical methods. Almost all deposits and occurrences were identified at the surface or beneath a thin discontinuous veneer of glacial sediment. Detailed investigation and integration of geophysical and geologic data provides an improved understanding of the 3D geological structure, which in turn will enhance the ability to vector in on mineralised horizons, even into areas that have hitherto been considered to be largely unprospective.

The data used in this study comes from: 1) the 1994 EXTECH II airborne geophysical program that comprised total field magnetic, gamma spectrometry and electromagnetic, 2) TGI-3 funded ground-based, gravity based on ca. 3500 new gravity stations collected in 2006 on a regional, nominal 1 km grid (modified in relation to access constraints), ca. 2200 pre-existing data points and ca. 700 data points from a series of high resolution sections collected in 2008, and 3) a digital topographic database from the Government of New Brunswick that gives a 70 m topography grid for the region. These data are reprocessed and combined to produce of a series of transects across major structural and/or economically significant parts of the BMC. Dips of units are mostly based on magnetic data, with the thickness of units by Bouguer gravity.

Major results include categorising the thickness of the volcanic units. Most notably the Flat Landing Brook Formation shows a thickness of over 10 km in the central portion of the BMC, and the mafic volcanic rocks in the Nine Mile Synform extend to beyond 5 km deep. Next, a large gravity anomaly to the southeast of the BMC is interpreted as a hidden ophiolite, for which the Tomogonops Formation is in part its cover. Also, the Mullin Stream Granite is thrust over the Sheephouse Brook felsic volcanic rocks and the associated Chester ore horizon. As a consequence of these and other results, the BMC bedrock geology needs to be modified to reflect the new structural models.

Abstract for poster presentation.

Funding: Geological Survey of Canada, TGI-3.



MAXIMIZING ORE EXTRACTION AT XSTRATA ZINC: BRUNSWICK MINE

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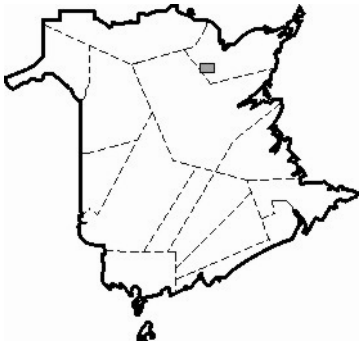
Brunswick Mine, an underground lead and zinc mine located near Bathurst, New Brunswick, has been in operation since 1964. During the last 46 years, metal prices have fluctuated and mining has adjusted accordingly. As the end of the mine life draws near, it is critical to mine the ore reserves to their full potential. Since 2007, a final review of the resources and remnants was set in motion by the mine engineering and geology departments to maximize ore extraction. The use of “new” technologies and strategies has been instrumental in recovering ore once considered unmineable. In the midst of fluctuating metal prices, economic review was often challenging and required nerve to hold steadfast on forecasted metal prices. This talk will document the evolving process employed to evaluate resource economics, required infrastructure, and mine sequence optimization. Significant capital expenditure was spent during this time to ensure required information was gathered to make sound engineering decisions.

Abstract for oral presentation.



TILL GEOCHEMISTRY OF THE BURTTS CORNER WEST AND NAPADOGAN MAP AREAS (NTS 21 J/02W AND J/07), CENTRAL NEW BRUNSWICK, AND THE EXTENT OF THE FREDERICKSBURG AND LIME-KILN BROOK BASAL TILL ANOMALIES

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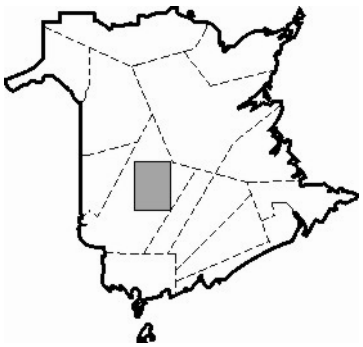
Previous basal till sampling in parts of the Burtts Corner (NTS 21 J/02) and Napadogan (NTS 21 J/07) map areas identified two significant anomalies to the west-southwest of the Village of Stanley. The Fredericksburg Sb anomaly comprised 13 contiguous sites (2 km grid) centred over the Silurian Burtts Corner Formation that exhibited regionally anomalous Sb values (>3.2 ppm). It was associated with a southwest trending belt (6 sites) of anomalous Sb that was open to the southwest. The Lime-kiln Brook Cu anomaly, partially overlapping the Fredericksburg anomaly, comprised 7 contiguous sites with >56 ppm Cu, and was open to the northeast, where it extended into the area underlain by the Silurian Cross Creek Formation. To determine the true extent of these anomalous areas, basal till sampling using the GSB standard 2 km grid spacing was completed in 2009 for the Napadogan map area and for the west half of the Burtts Corner map area.

The data for the new sites indicates that elevated Sb values (≥ the 75th percentile level) are characteristic of till overlying the Silurian Burtts Corner Formation. Similar values are also associated with Cambro-Ordovician and Ordovician rocks of the Miramichi and Tetagouche groups to the northwest. Also, a broad dispersal train of Sb at concentrations greater than the 75th percentile level extends approximately 20 km southeastward from the Fredericksburg anomaly onto the Carboniferous Minto Formation. Three new multi-site Sb anomalies were identified in the Napadogan map area: two located over the Burtts Corner Formation approximately 6 km and 12 km to the north of the Fredericksburg–Lime-kiln Brook area; and the other over the Ordovician Push-and-Be-Damned Formation to the northeast of the Turnbull Mountain mineral occurrence in the northwestern part of the area. As with the Fredericksburg and Lime-kiln Brook areas, other elements of economic interest such as Cu occur at anomalous levels in these three new areas.

The new data suggest the Lime-kiln Brook Cu anomaly does not extend further to the northeast than previously noted. However, there is a belt of elevated to regionally anomalous Ni in this direction. This belt largely corresponds with the mapped extent of the Silurian Cross Creek and Hayes Brook formations, indicating a probable correlation with these stratigraphic units.

Abstract for oral presentation.

Funding: New Brunswick Geological Surveys Branch ordinary budget.



MIDDLE TO LATE PLEISTOCENE STRATIGRAPHY OF CENTRAL AND SOUTHERN NEW BRUNSWICK

ALLEN SEAMAN
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The Pleistocene history of New Brunswick is now known to extend back in time to the Illinoian glaciation (ca. 190–130 ka), during which Northumberland Phase glaciers flowed east to east-southeastward across the Maritime Provinces. This phase generated large- and small-scale glacial erosion forms, and deposited the compact Northumberland till. During the subsequent Sangamonian Interglacial (128–75 ka), New Brunswick was deglaciated, and thus subject to subaerial weathering, erosion, and fluvial sedimentation. Wisconsinan glaciation began with the Early to Mid-Wisconsinan (ca. 75–50 ka) Caledonia Phase, a southeast to south-southeast-trending flow pattern that deposited widespread basal till deposits with accompanying erosion forms. The latter part of the Mid-Wisconsinan was a period of glacial thinning and retreat, though New Brunswick remained glaciated. Late Wisconsinan (ca. 25–13 ka) Escuminac, Scotian, and, Chignecto glacial phases generated widespread erosion marks while commonly reworking (hybridizing) previously deposited Caledonia till, but only locally deposited identifiable tills of their own.

Field work for the summer of 2010 concentrated on searching for occurrences of the Northumberland till and Sangamonian interglacial deposits. It was conducted in four previously studied areas: around Miramichi Lake (northwest corner of NTS 21 J/07), where Sangamonian fluvial sediments (> 51.7 ka) had been identified; in the area to the east of the Early Carboniferous Carlisle Formation (border area between NTS 21 J/03E and J/06E), where a remnant of a Northumberland Phase dispersal train had been identified; near Crabbe Mountain (in the east-central part of NTS 21 J/03), where till overlying gravel had been observed in a gravel pit; and in the Sussex (NTS 21 H/12) and Petitcodiac (NTS 21 H/14) areas of southeastern New Brunswick, where non-finite dates (> 35 ka and > 40 ka) had been obtained for bulk organic samples from two stratigraphic sections in gravel pits.

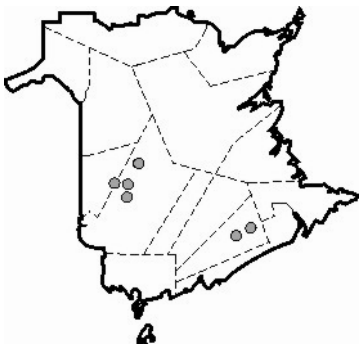
Exposures of till overlying sand or gravel were noted at twelve sites around Miramichi Lake, indicating that the Sangamonian Half Moon Sediments are probably extensive in this low-lying area. The till thickness is highly variable, from 0.5 m to an observed 2.3 m. At one site the till thickness varied from 0.7 m to > 1.7 m over a distance of only 12 m. At the Crabbe Mountain site, up to 2.7 m of till overlying sandy gravel was observed. The measured till fabric at this site was parallel to the Caledonia Phase flow. Therefore, the underlying gravel unit is probably correlative with the Half Moon Sediments.

Till fabric measurements in sections in the area of the Northumberland Phase dispersal train indicate that the Northumberland till, per se, is present only at depth. The surface till is less red, suggesting mixing of reworked Northumberland material from the dispersal train with brownish material from elsewhere. The fabric of this upper till is variable from site to site, but is always parallel to one of the Late Wisconsinan ice-flow events.

New samples of organic material were collected from the pits near McGregor Brook and Springdale, in southeastern New Brunswick. These samples will be dated using the accelerator mass spectrometer (AMS) carbon 14 dating method. The fabric in the organic-bearing till at McGregor Brook is parallel to the Caledonia Phase flow direction, implying strongly that the organics are of Sangamonian age.

Abstract for poster presentation.

Funding: New Brunswick Geological Surveys Branch ordinary budget.



SECURING THE SOCIAL LICENSE TO OPERATE: PUBLIC ENGAGEMENT STRATEGIES THAT SUCCEED

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A new imperative confronting corporate and government participants in the natural resource, environment and energy sectors is how to attain, and maintain, the social license to operate. Countless organizations involved in development, resource extraction and distribution, construction and infrastructure projects are facing growing controversy over and resistance to their proposed activities. In this increasingly complex environment, the regulatory requirements for public engagement are continually escalating, as are the demands from people and communities; and the spirit in which an organization enters into the public engagement process is vital to a successful outcome for all participants.

Today, society is demanding more transparency, and many not only want to be informed of an organization's activities and performance, but also want to be involved in setting social and environmental performance objectives. Greater community involvement from the outset can mitigate early opposition and unnecessary and costly project delays. Public engagement programs are the first step in the success of a project investment, helping to build long-term relationships based on openness, respect and trust.

Certified by the International Association for Public Participation (IAP2), MT&L Public Relations will provide conference participants with strategies and tools for effective public engagement programs that succeed. This session will feature case studies involving major New Brunswick and regional infrastructure projects - from wind energy to biomass, natural gas to major highway projects.

Abstract for oral presentation.

DRILLING TECHNOLOGIES IN EASTERN CANADA

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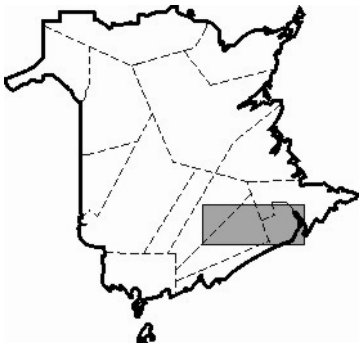
Eastern Canada has seen varying land drilling activity over the past decade depending on exploration success and gas price fluctuations. The drilling rig and associated drilling technology selection has sometimes been limited to the rig that is in the area rather than a fit for purpose rig. There is now a unique type of rig in New Brunswick; a Coil Hybrid Drilling Rig.

During the summer of 2010, Corridor Resources and Pétrolia Inc. contracted a Coil Hybrid Drilling Rig and some unique directional tools to drill three wells on Anticosti Island. This rig is now currently drilling in New Brunswick and can supply the drilling needs of operators requiring a fast moving drilling rig capable of drilling up to 2200 m depth.

This presentation will discuss the drilling application and experience of drilling with the coil hybrid rig and the application of several technologies used in conjunction with the hybrid rig.

Abstract for oral presentation.



CONTINENTAL NICKEL'S NEW NI-CU DISCOVERY IN ST. STEPHEN, NEW BRUNSWICK

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In 2008, Continental Nickel optioned 129 claims in the St. Stephen area from Abitex Resources of Val d'Or, Québec. The St. Stephen property is underlain by interbedded quartzites and sulphidic argillites of the Ordovician Cookson Formation which were intruded by Devonian mafic to ultramafic intrusions of the St. Stephen Igneous Complex. The intrusive rocks are comprised of gabbro, norite, troctolite, and peridotite.

The mafic to ultramafic rocks host several historical sub-cropping, nickel-copper sulphide occurrences with original discoveries dating back to the 1880's. Previous exploration work resulted in the delineation of three deposits, Roger´s Farm, Hall-Carroll, and C Zones for which non 43-101 compliant mineral resources were estimated.

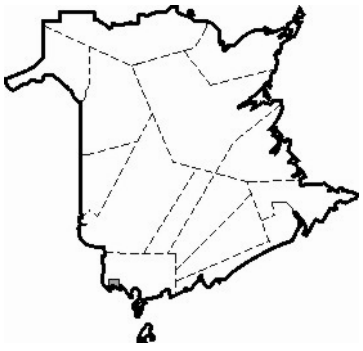
Over the past 40 years, minimal exploration was carried out at St. Stephen. Continental Nickel acquired the property based on the existence of prospective nickel sulphide zones which had not been explored with current deep penetrating EM geophysical techniques.

In 2008–2009, Continental Nickel commissioned a compilation of historical exploration data and reviewed the data from the airborne magnetic and VTEM survey completed by Abitex in 2004. Selected targets were identified and surveyed with a large, fixed loop, ground TDEM geophysical survey. This survey detected several high conductance anomalies associated with known mineralization as well as several new anomalies not tested by previous drilling.

In 2010, a $300,000 exploration and diamond drill program was planned to test the newly identified and untested high conductance EM targets as well as test for extensions of mineralization at Rogers Farm and E zones. A diamond drill program completed in June and July resulted in three new Ni-Cu discoveries. The most significant EM anomaly, Triple J, was tested over a strike length of 100 m and intersected two zones of mineralization. Diamond drill hole SSD10-004 returned 0.63% Ni, 0.22% Cu over 21.45 m in the lower zone. SSD10-003, drill to test the historic 'Anomaly G' intersected 1.0% Ni, 0.29% Cu over 9.3 m, including 2.0% Ni, 0.56% Cu over 3.3 m.

Further drilling to explore the newly discovered Triple J and G nickel-copper sulphide zones is warranted and will be incorporated in future exploration programs. In addition, numerous untested and poorly tested airborne VTEM anomalies exist on the property which will be prioritized for exploration with additional ground EM surveys.

Abstract for oral presentation.



ALBERT COUNTY OIL SHALE OIL SHALE SYNCRUDE: CONCEPTUAL PROCESS DEVELOPMENT

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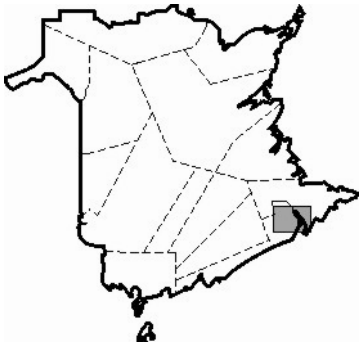
Altius Resources Inc. has progressed with several development programs to delineate oil shale resources, characterize the quality of shale oil, and assess conceptual alternatives for the commercial production of shale oil syncrude from Albert County oil shale.

Detailed oil shale, shale oil, and spent shale characterization studies have been conducted on drill core samples based on bench scale retorting of oil shale and upgrading of the shale oil. A conceptual process for syncrude production includes the co-generation of electric power, treatment of waste gas, solid waste disposal, and water management.

The proposed process technology and preliminary production economics may be used as a reference for the geological evaluation of oil shale resources, mine plan development, and the assessment of alternative production strategies to comply with environmental guidelines and syncrude end-user specifications.

Abstract for oral presentation.



MOUNT PLEASANT METALLURGICAL DEVELOPMENT STUDIES

J. DEAN THIBAULT
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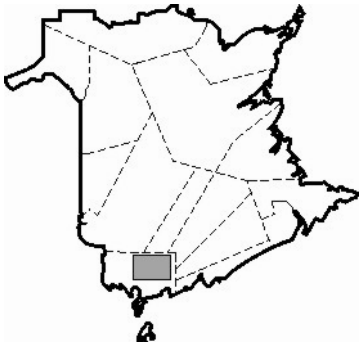
The development program for the North Zone at Mount Pleasant is focused on the definition of process technologies for the production of tin concentrate, indium sponge, and zinc metal. Several pilot test programs are in progress as a follow up to the North Zone preliminary economic assessment completed on January 23, 2010.

The North Zone pilot test programs included the assessment of a fully integrated flotation process for both tin and zinc concentrate production. A hydrometallurgical process for the production of added value indium and zinc metals from zinc concentrates has also been developed as a novel process technology.

The metallurgical test programs for the North Zone are intended to verify the proposed process technologies and product quality and to provide definitive design information for subsequent feasibility studies.

In addition to the North Zone development studies, bench scale tests have been completed to assess alternative processing technologies for the recovery of tungsten and molybdenum from the Fire Tower Zone.

Abstract for oral presentation.



GEOLOGICAL AND STRUCTURAL MAPPING OF THE PARTRIDGE ISLAND BLOCK AND ADJACENT AREAS, SOUTHERN NEW BRUNSWICK

ROBERT L. TREAT[1], SANDRA M. BARR[1], ADRIAN F. PARK[2], CHRIS E. WHITE[3], AND PETER H. REYNOLDS[4]
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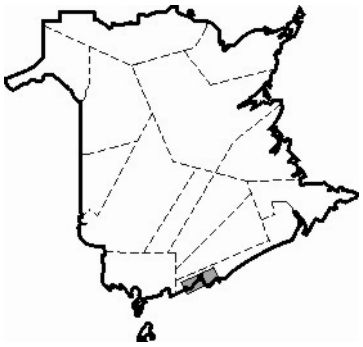
The Partridge Island block consists of three areas of enigmatic and highly deformed rocks located in and near the city of Saint John in southern New Brunswick. During the summer of 2010, detailed geological and structural mapping was conducted in the Partridge Island block and associated rocks in an attempt to better elucidate its relationship to adjacent Carboniferous, Cambrian, and Neoproterozoic units, as well as to characterize the rocks of the Partridge Island block itself. On Partridge Island and east of Saint John in the Red Head area, these rocks are diorite to quartz-diorite gneiss containing variably altered plagioclase, K-feldspar, and hornblende porphyroclasts in a matrix of quartz, chlorite, sericite, and opaque minerals. In some areas, quartz-chlorite-muscovite schist is also present, and is likely the product of local retrograde metamorphic conditions. The muscovite yielded a $^{40}Ar/^{39}Ar$ cooling age of 332 ± 3 Ma. These crystalline rocks are partly mylonitic and occupy the core of a syncline as a fault-bounded block, thrust on top of a Carboniferous sedimentary sequence. Some of the Carboniferous units were deformed during overthrusting and later deformation involved folding around the more competent material. The gneisses of the Partridge Island block are structurally overlain by variably deformed basalt and red and grey siltstone of the Taylors Island Formation. West of Saint John in the Lorneville area, the most abundant component of the Partridge Island block is variably deformed syenogranite or rhyolite containing tectonic inclusions of thinly laminated quartzite and quartz-chlorite-muscovite schist, which are likely of metasedimentary origin. The syenogranite consists of K-feldspar porphyroclasts in a matrix of quartz, K-feldspar, and opaque minerals, and displays a metamorphic texture ranging from protomylonitic to ultramylonitic and phyllonitic. The rocks in this area are also extensively mineralized by numerous hematite and quartz-siderite veins, with previously unreported IOGC-type mineralization present in some places. A more detailed study is underway to further characterize the petrology and deformational history of the rocks in the Partridge Island block, to see how they fit into the complex tectonic history of the Saint John area, and to further investigate the IOCG economic potential.

Abstract for poster presentation.

Funding: New Brunswick Geological Surveys Branch and Natural Science and Engineering Research Council of Canada Discovery Grant.



PORTABLE X-RAY FLUORESCENCE SPECTROMETRY: A NEW TOOL FOR THE NEW BRUNSWICK GEOLOGICAL SURVEYS BRANCH

JAMES WALKER
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Traditional X-Ray Fluorescence Spectrometry (XRF) analysis has been used in commercial geochemical laboratories for many years. It was the most reliable and cost-effective analytical method for the determination of major- and some trace-elements until it was supplanted, in the 1990s, by techniques such as inductively-coupled plasma emission spectrometry (ICP-ES) & inductively coupled plasma mass-spectrometry (ICP-MS). Portable (hand-held or bench-top) XRF technology was developed in the early 1990s and has found practical uses in materials testing (e.g. scrap metal sorting), consumer safety (e.g. identifying Pb in paint), forensics, and environmental fields. However, the manufacturers of these systems have only recently seen fit to design hardware and software for earth sciences applications (e.g. mining, mineral exploration, geological mapping, etc.).

In the spring of 2010 the New Brunswick Geological Surveys Branch acquired a portable (bench-top) X-Ray Fluorescence Spectrometer from INNOVX Systems©, to complement ongoing mineral deposits studies. The bench-top technology offers the highest power available in a portable XRF system, resulting in the lowest detection limits and highest precision. The system has several modes for detecting many elements with atomic numbers greater than 12 (magnesium). The benefits of portable XRF analysis are many: non-destructive, instant (from 30 seconds to less than 2 minutes), little or no sample preparation required, minimal setup/calibration and flexibility. Several operating modes (each with a different element package) provide detection limits ranging from wt % level for “ore” samples down to 1–100 ppm for low concentrations of trace-elements in rocks using the “soil” mode. The system can be used with a wide range of media, including rock, drill core, soils, and thin-sections. With the acquisition of additional hardware attachments the system has the ability to analyze water samples as well. As with most geochemical techniques sample preparation is important. This system has a sensor window that is approximately 1 cm^2 in area. Consequently, the system works best on single mineral grains or on very fine-grained homogenous rocks. In order to obtain accurate results for coarse-grained samples it is best to pulverize and then mechanically split the sample prior to analysis.

At present, the major drawback of the system is its inability to detect the light elements, i.e. those with atomic numbers of 12 or less, and the relatively high detection limit for gold; however, with rapidly advancing technology and software, the ability to accurately detect and measure the lighter elements with this system is likely forthcoming.

Abstract for poster presentation.

Funding: New Brunswick Geological Surveys Branch ordinary budget.

WILDCAT MOLYBDENUM PORPHYRY: 2010 DRILLING UPDATE

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The Wildcat property is situated 10 km east of the Mount Pleasant Sn-Mo-W-Zn-In deposit. The target area is a package of Ordovician-Silurian sediments (Kendall Mountain, Digdeguash, and Sand Brook Formations) lying between the Jake Lee Mountain Granite to the north and the Magaguadavic Granite to the south. These granitic units have a strong positive magnetic response and can be traced throughout the district based on this distinctive magnetic signature. By comparison, the sediments are magnetically neutral. What drew attention to this area was the presence of a small, isolated magnetic high lying several hundred meters north of the Magaguadavic Granite-Kendall Mountain Formation contact. This magnetic high seemed to indicate the possibility of a satellite pluton or cupola intruding the sediments in this area.

The quartz veins outcropping in the discovery area consist of several distinct types - (a) glassy with pyrite and chlorite, (b) glassy, white, barren, (c) milky white, waxy with wolframite, (d) banded saccroidal “ribbon” quartz with wispy fine grained molybdenite, (e) vuggy, saccroidal with pyrite, arsenopyrite, sphalerite, and galena.

Initial sampling gave assays of up to 0.65% MoS_2 and 0.11% WO_3 in greissen-quartz veins. Subsequent prospecting throughout the claims resulted in the discovery of numerous mineralized quartz floats carrying significant wolframite-molybdenite. Distal to the molybdenite-wolframite-bearing veins, Pb/Zn mineralization occurs as veins and cavity infilling in brecciated, indurated wacke to the north, southeast, and east of the discovery area. Analysis of the wolframite gave up to 13.93% WO_3 (more commonly 0.12% WO_3) while the typical quartz-sulphide boulders averaged 0.055% MoS_2. The galena-sphalerite boulders averaged 3.0% Zn, 1.5% Pb, 32gpt Ag and 60 to 160 ppm In.

The host rock for the mineralized quartz stockworks is a pervasively altered-primarily greissenization and locally massive chlorite-wacke and spotted (cordierite?) argillaceous wacke. These units are probably part of the Kendall Mountain Formation. This unit appears to strike 060 T and dip steeply to the north. The metasediments are cut by several highly altered feldspar porphyry dikes < 8.0 m in width, and in the vicinity of the magnetic high, a 10 m wide diabase dike. The porphyry dikes are strongly sericitized and are occasionally cut by molybdenite-bearing quartz veins. The quartz-greissen zones appear to be sub-parallel to the stratigraphy but dip at 75 degrees to the north. This may be related to “sheets” of greissenization, emanating from a granite source located at depth to the south of the drilled area, that cross-cut the stratigraphy at a low angle.

It is evident from the discoveries made this past season that a large quartz stockwork with attendant greissenization exists around the magnetic high. The magnetic high represents pyrrhotite-pyrite-magnetite mineralization peripheral to a buried granite or porphyritic body from which the quartz vein swarms are derived. The base-metal tungsten-indium mineralization found to the east and southeast of the discovery zone is hosted by quartz veined brecciated and silicified wacke with pyrrhotite, pyrite, and magnetite - basically rocks identical to those intersected in the drilling. It is felt that this mineralization represents zoned mineralization distal to the main molybdenite-tungsten mineralization.

The 2008 drilling carried out on the Wildcat property revealed the presence of a mineralized metamorphic aureole defined by a zone of extensive molybdenite-wolframite-bearing quartz stockworks and pervasive greissenization lying within a positive aeromagnetic anomaly. This anomaly, which is in a steeply dipping, late Ordovician to early Silurian wacke, black shale, and carbonate package, is located several hundred meters north of the main contact between the Magaguadavic monzogranite and the metasediments. It is thought that this isolated anomaly represents a buried cupola or appendage related to the main granite body.

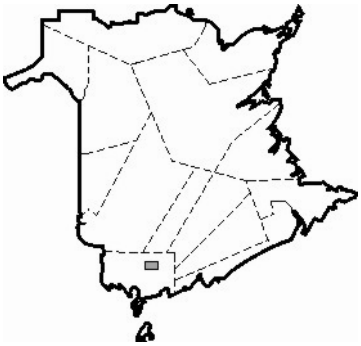
Numerous, highly altered (sericitic) quartz-feldspar-porphyry and diabase dikes were intersected in the 2008 and 2009 diamond drilling programs. These dikes are intimately associated with the greissenization and mineralized quartz stockworks. The quartz stockworks are host to widespread, low grade molybdenite mineralization and widely spaced, high grade wolframite-arsenopyrite veins that carry up to 893 ppb Au. These veins zone laterally into Pb/Zn + W + In + Ag veins and breccia 1 km to the east. Drill results show up to 3.18% W, 0.08% Bi and 3.9% As/1 m. The most significant drill intersection being in DDH # WC 09-03 where a molybdenite-bearing porphyry dike was encountered at 49.06-57.20 m carrying 0.071% Mo/8.7 m. The 2010

drill program consisted of 3 holes totaling ~ 500 m to confirm WC 09-03 at depth and along strike. All holes intersected the dike with grades similar to 2009 results but over widths of up to 25 m.

This dike occurs in a mineralized, greissenized, quartz stockwork porphyry dike zone some 800 m in strike and some 80 m in width. The porphyry dike itself is felt to represent the nature of the suspected granite porphyry at depth. Intensity of mineralization appears to increase with depth.

The surface mapping, trenching, and diamond drilling completed on this property since 2006 support a geological deposit model similar to the Henderson ore body, Colorado.

Abstract for oral presentation.



STRATIGRAPHY AND STRUCTURE OF SILURIAN ROCKS SURROUNDING THE ORDOVICIAN ELMTREE INLIER

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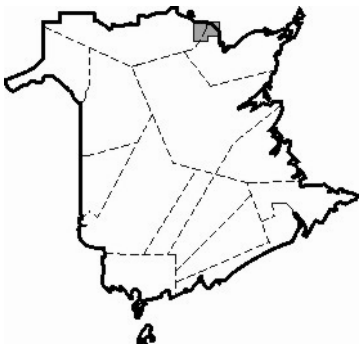
The Elmtree Inlier comprises Middle to early Late Ordovician rocks of the Fournier Group, which, together with coeval (and older) volcanic and sedimentary rocks of the northern Miramichi Highlands to the south, were incorporated in the Brunswick Subduction Complex in the Late Ordovician to Early Silurian. Exhumation and unroofing of the Fournier Group was underway by the middle Llandovery, as recorded by unconformably overlying rocks of the Chaleurs Group, beginning with fine- to very coarse-grained, polymictic, sedimentary rocks of the Llandovery C_3-C_6 Weir Formation. The Weir is overlain by micritic, biostromal limestones, calcarenites and fine-grained calcareous sandstones of the La Vieille Formation. On the western margin of the Elmtree Inlier, the Early Silurian succession is unconformably overlain by Late Silurian (Ludlovian) volcanic rocks of the Bryant Point and Benjamin formations. Elsewhere, the La Vieille Formation is unconformably overlain by a sedimentary sequence consisting of (in ascending stratigraphic order) Ludlovian shallow-water to terrestrial sandstones and conglomerates of the Simpsons Field Formation, late Ludlovian to Pridolian reefal limestones and laminated lime mudstones and siltstones of the LaPlante Formation, and Pridolian to early Lochkovian(?) laminated, calcareous, fine- to medium-grained shelf sandstones of the Free Grant Formation. The latter sequence forms the sedimentary fill of the Nigadoo River Syncline, which lies between the Elmtree Inlier and the northern Miramichi Highlands.

The Silurian unconformity recorded in the cover rocks of the Elmtree Inlier is attributed to the Salinic Orogeny. The duration of the Salinic hiatus is well constrained by the late Llandovery-early Wenlock age of the La Vieille limestones (ca. 428 Ma), and a rhyolite very near the base of the Bryant Point Formation that has yielded a U-Pb zircon age of 422.3 ± 0.3 Ma. Silurian rocks above and below the unconformity have historically all been assigned to the Chaleurs Group because strong evidence for the unconformity has only recently come to light; however, consideration must be given to the introduction of a new group name for the younger sequence. Salinic deformation on the western margin of the Elmtree Inlier is characterized by westerly overturning of the Weir and La Vieille formations, implying that the contact with the Elmtree Inlier is tectonic, i.e., a west-verging thrust fault. In contrast, Late Silurian and younger rocks all dip to the west and are right-way-up. On the eastern side of the Inlier, at Limestone Point, the Simpsons Field Formation overlies the La Vieille with an angular discordance of approximately 20°–30°; however, overturning of Early Silurian beds is only locally observed. Salinic folds trend approximately N-S to NNW-SSE, and have no axial planar cleavage. Their existence is readily inferred by the steep plunges of Acadian (Devonian) folds, which are transected by weak to strong axial planar cleavage. All units are offset by Middle to Late Devonian, dominantly dextral faults that form a complex network of splays and shear zones associated with the Rocky Brook-Millstream Fault, a major northern Appalachian dextral fault system.

Abstract for oral presentation.

Funding: New Brunswick Geological Surveys Branch ordinary budget.



THE PETROLOGICAL AND MINERALOGICAL CHARACTERISTICS OF THE FELSIC INTRUSIVE UNITS AT THE SISSON BROOK W-MO-CU DEPOSIT, WEST-CENTRAL NEW BRUNSWICK

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The Sisson Brook W-Mo-Cu deposit is situated in west-central New Brunswick, along the eastern margin of an extensive belt of "Acadian" plutonic rocks that underlie the Miramichi Highlands. The rocks hosting the deposit consist of a thick sequence of Cambro-Ordovician continental and marine volcanic and sedimentary rocks of the Miramichi and Tetagouche groups that have been intruded by the Early Devonian Howard Peak diorite-gabbro, Nashwaak Granite (422 ± 4 Ma, Rb-Sr muscovite age and 386 ± 5 Ma, K-Ar muscovite age), and a later porphyry dyke (364.5 ± 1.3 Ma, U-Pb zircon age). This work focuses on classifying various felsic units according to their mineralogy, petrology, major- and trace-element characteristics, and deducing their petrogenesis and the formation environment of the mineralization.

Three types of felsic units were identified in the vicinity of the deposit. The Group I samples (representing the Nashwaak Granite) were collected from outcrops along the eastern margin of the pluton and one sample from a drill hole. They are light pinkish grey, medium- to coarse-grained, and locally slightly foliated. Biotite is abundant (20%) in these samples with accessory zircon, apatite, monazite, magnetite, and ilmenite. This group has low Zr/TiO_2 (0.04 to 0.07), high K_2O (4.24 to 6.58 wt %), high A/CNK (>1.1), high molar K_2O/Na_2O ratio (> 1), high Zr/Y (>3), high $(La/Yb)_N$ (2.35 to 31.9). The iron number [Fe/(Fe+Mg)] ranges between 0.68 and 0.78, which denotes their magnesian attributes.

Group II samples (collected from drill core) consist of dykes that crosscut the Howard Peak intrusion. They range from centimetres of dykelets up to 12.21 m of a single dyke with generally sharp contacts that are locally irregular. This granite is light greenish grey (due to sericitization), medium- to coarse-grained, and unfoliated. Biotite is the dominant ferro-magnesian mineral in this group coexisting with apatite, pyrrhotite, and titanite. They are broadly characterized by high Zr/TiO_2 (0.06 to 0.19), low A/CNK (<1.1), low molar K_2O/Na_2O ratio (< 1), low Zr/Y (<4), and low $(La/Yb)_N$ (<7). They have slightly high iron numbers (0.63 to 0.9) and some samples exhibit ferroan characteristics.

Group III comprises a sample of the previously dated porphyry dyke that was intersected in drill hole SSN-26. Phenocrysts consist of approximately 23% plagioclase (up to 1 cm), 10 % quartz (up to 7 mm), 8 % biotite (up to 0.03 mm), and 7 % K-feldspar (0.2 to 1.0 cm). This porphyry dyke has low Zr/TiO_2 (0.03), low A/CNK (0.99 to 1.05), low molar K_2O/Na_2O ratio (<1), medium Zr/Y (6.62), and medium $(La/Yb)_N$ (8.91).

These granites are typical of those formed in a volcanic arc environment (i.e., low Nb, Y, and Rb content). Group I and Group III have continental arc signatures (Zr/Y>3) whereas Group II has oceanic arc characteristics (Zr/Y<3). Barium, Nb, Sr, P, and Ti depletion in conjunction with the composition of biotite also supports their arc magma affiliation. These magmas were emplaced at low pressures (<2 Kbar) and low temperatures (<800ºC), with slightly oxidized characteristics (oxygen fugacity between 10^{-13} and 10^{-16}). The $fHF/fHCl$ ratio of later fluids is higher than typical porphyry Cu deposits and lower than porphyry Mo deposit, but similar to the CanTung tungsten deposit in the Northwest Territories, Canada. The formation of these granites is related to tectonomagmatic activities in the Canadian Appalachians, which occurred during Middle Ordovician to Late Devonian.

Abstract for poster presentation.

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